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L1 4366 S (SCREEN? OR SEARCH? OR DISCOVER? OR INVESTIG? OR EVALUAT? OR  
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OR DISCOVER? OR OPTIMI?)

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L3 ANSWER 6 OF 70 CA COPYRIGHT 2002 ACS  
AN 137:38769 CA  
TI Combinatorial screening and optimization of luminescent materials and  
organic light-emitting devices  
AU Sun, Ted X.; Jabbour, G. E.  
CS USA  
SO MRS Bulletin (2002), 27(4), 309-315  
AB A review. The rapid development of modern photonic technologies-for  
example, Hg-free lamps, flat-panel displays, and solid-state lamps-demands  
the timely **discovery** of advanced **phosphors**. A **combinatorial** process was  
developed to dramatically accelerate the exptl. **search** for such **phosphors**.  
High-d. **phosphor libraries** contg. from 100 to over 1000 discrete chem.  
compns. on a 1 in. x 1 in substrate were made in thin-film or powder form  
using selective vapor deposition and liq.-dispensing techniques, resp. The  
existing methods of **combinatorial** synthesis and **screening** of **phosphors** will  
be reviewed with examples. These methods may also be used to screen org.-  
based solid-state materials and **optimize** their device properties. In this  
regard, **combinatorial** and spreading techniques were used to study and  
rapidly **optimize** org. light-emitting devices (OLEDs).

ANSWER 15 OF 70 CA COPYRIGHT 2002 ACS  
AN 135:279858 CA  
TI The blue phosphor Sr<sub>2</sub>CeO<sub>4</sub> synthesized by Pechini's method  
AU Serra, O. A.; Severino, V. P.; Calefi, P. S.; Cicillini, S. A.  
CS Chemistry Department, FFCLRP, University of Sao Paulo, Ribeirao Preto,  
14040-901, Brazil  
SO Journal of Alloys and Compounds (2001), 323-324, 667-669  
AB Blue emitters are very attractive research subjects because of their  
possible industrial applications as phosphors for field emission displays.  
Recently, a blue **phosphor**, Sr<sub>2</sub>CeO<sub>4</sub>, was **identified** by a **combinatorial**  
materials synthesis technique. This material was further synthesized using  
the chem. copptn. method and the decompn. of acetates, carbonates and  
oxalates in a tedious procedure. In this work, the authors present the use  
of Pechini's method as an alternative for the synthesis of this promising  
material. When the precursor, (Sr/Ce) polymer citrate-ethylene glycol, was  
fired at 850 °C for 2 h, a mixt. of Sr<sub>2</sub>CeO<sub>4</sub> and SrCeO<sub>3</sub> (inactive) was  
obtained, whereas the amt. of Sr<sub>2</sub>CeO<sub>4</sub> was increased by further heating at  
1100 °C for 2 h in an oxygen atm., as shown by the diffraction pattern.  
The excitation spectra present two broad bands with maxima at 294 and 344  
nm and the emission spectrum has a broad band (half width ~80 nm) centered  
at ~475 nm. The unusually long lifetime of the compd. fired at 1100 °C of  
~0.04 ms is in good agreement with literature data. In conclusion, the  
blue phosphor material Sr<sub>2</sub>CeO<sub>4</sub> synthesized at 1100 °C in an oxygen flux has  
comparable or even better emitter properties than that prep'd. over several  
days and/or at higher temps. The method is very attractive for industrial

purposes.

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ANSWER 20 OF 70 CA COPYRIGHT 2002 ACS

133:243270 CA

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Applications of **combinatorial** chemistry to industrial catalysis

De Lue, Norman R.; McGuffey, Angela M.

SABIC Technology Center, SABIC Americas, Inc., Houston, TX, 77084, USA

Arabian Journal for Science and Engineering, Section A: Sciences (2000), 25(2A), 73-88

A review with 50 refs.; **combinatorial** chem. is a new tool for carrying out R&D in a time and cost saving manner. The technol. combines the relatively new technologies of automation and robotics, computer design and control, and sensitive, high-speed anal. methods to carry out **discovery** of new materials at a rapid pace. Instead of the traditional one expt. at a time approach, dozens or even thousands of expts. can be carried out concurrently or in parallel. The methodol. has been utilized successfully in the pharmaceutical industry beginning about ten years ago. Recently, the techniques have proven successful for rapid **discovery** of new inorg. materials such as **phosphors**, **luminescent** materials, dielecs., and other electronic materials. The application of these powerful techniques for catalyst **discovery** is only just beginning. This review gives a basic introduction to the concepts of **combinatorial** chem., the current state of its application to catalysis, and a description of the challenges and opportunities in attempting to duplicate the success in the life sciences.

L3

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ANSWER 21 OF 70 CA COPYRIGHT 2002 ACS

133:108734 CA

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Synthesis of barium hexaaluminate phosphors using **combinatorial** chemistry

Park, Eung Suk; Choi, Yoon Young; Sohn, Kee-Sun; Kim, Chang Hae; Park, Hee Dong

Display Phosphor Group, Korea Research Institute of Chemical Technology, Teajon, 305-600, S. Korea

Han'guk Seramik Hakhoechi (2000), 37(2), 134-139

The main objective of the present investigation is to show the feasibility of **combinatorial** chem. by applying this method to phosphor syntheses. In this respect barium hexaaluminate phosphor was prep'd. by the split-pool **combinatorial** method, which enabled much more rapid **search** of optimum compns. of target **phosphors** than conventional synthetic methods. Barium hexaaluminate phosphors doped with Eu<sup>2+</sup> exhibit blue emission while those co-doped with Mn<sup>2+</sup> and Eu exhibit green emission. Basically, the phosphor doped with 1.3 mol of Ba and 0.06-0.15 mol of Eu<sup>2+</sup> exhibit the max. value of emission intensity at 435 nm. Under the UV and VUV excitations, the barium hexaaluminate phosphor co-doped with Mn<sup>2+</sup> and Eu<sup>2+</sup> shows strong green emission.

L3

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ANSWER 22 OF 70 CA COPYRIGHT 2002 ACS

133:96038 CA

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**Combinatorial** approach in **search** of **luminescent** materials

Sun, Ted X.; Xiang, X.-D.; Srivastava, Alok M.

Corporate R&D, General Electric Company, Schenectady, NY, 12309, USA

Proceedings - Electrochemical Society (2000), 99-40(Physics and Chemistry of Luminescent Materials), 50-55

Review with 12 refs. Extensive work has been done in the last 60 yr in **search** of phosphors for Hg discharge fluorescent lamps and CRTs. The recent emergence of new lighting concepts and flat panel display (FPD) technologies, though, drives the needs for developing new phosphors under specific excitation conditions. For example, solid state lighting with GaN based UV or blue LED's, quantum splitting phosphors for Xe discharge lamps,

and low voltage phosphors for field emission displays, etc. To accelerate the **discovery** process and reduce the cycle time in **search** of new **phosphors**, **combinatorial** methods were developed and applied to **screen** for new **phosphors**. Some existing methods of **combinatorial** synthesis and **screening** of **phosphors** will be reviewed with examples. These methods are generic **combinatorial** tools and can be applied in the **discovery** of other solid state materials.

L3 ANSWER 25 OF 70 CA COPYRIGHT 2002 ACS

AN 132:286128 CA

TI Advanced phosphors

IN Xiang, Xiao-dong; Sun, Xiaodong; Schultz, Peter G.

PA The Regents of the University of California, USA

SO U.S., 11 pp.

PI US 6048469 A 20000411 US 1998-16577 19980130

PRAI US 1997-38981P P 19970226

AB Phosphors are claimed which are described by the general formulas  $(Gd_{2-a}Zn_a)O_3-\delta:Eu^{3+b}$  ( $0.0 \leq a \leq 2.0$ ; about  $0.0 \leq b \leq 0.02$ ; and  $0 \leq \delta \leq 1$ ),  $Gd_0.5Sr_0.4AlO_3+\delta:Eu^{2+0.1}$ ,  $La_0.5Sr_0.4AlO_3+\delta:Eu^{2+0.1}$ , and  $LnAlOpFs:At$  ( $Ln = La, Sm, Sr, or Gd$ ;  $A = Eu^{2+}, Eu^{3+}, Tb^{3+}, and/or Ce^{3+}$ ;  $(p+s) = 3+\delta$ ;  $0 < m \leq 1$ ;  $p \geq 0$ ;  $s \geq 0$ ;  $0 < n < 1$ ;  $0 \leq \delta \leq 1$ ; and  $0 < t < 1$ ). **Combinatorial** methods of synthesis and detection were used to prep. the phosphors.

L3 ANSWER 26 OF 70 CA COPYRIGHT 2002 ACS

AN 132:282780 CA

TI **Combinatorial** synthesis of advanced ceramic materials

AU Siegel, Andre

CS Department of Metallurgy and Materials Science, University of Toronto, Toronto, Can.

SO Canadian Ceramics (1998), 67(2), 17-21

AB A review with 12 refs. **Combinatorial** synthesis is a new method, both conceptually and exptl., of approaching a synthetic chem. project. It involves synthesis of a **library** of many compds. simultaneously, and the use of mass screening techniques to analyze them. In the field of advanced ceramics **combinatorial** synthesis has been approached by a thin film deposition technique, which led to functional **libraries** of applied electronic and luminescent materials. While having limitations, particularly with regard to structure characterization, this emerging technol. has the potential to lead to a quantum leap forward in the exploration of new compns. of materials.

L3 ANSWER 27 OF 70 CA COPYRIGHT 2002 ACS

AN 132:243383 CA

TI **Combinatorial** ion synthesis and ion beam analyses of materials **libraries** on thermally grown  $SiO_2$

AU Chen, C. M.; Pan, H. C.; Zhu, D. Z.; Hu, J.; Li, M. Q.

CS Shanghai Institute of Nuclear Research, Chinese Academy of Sciences, Shanghai, Peop. Rep. China

SO Materials Science & Engineering, B: Solid-State Materials for Advanced Technology (2000), B72(2-3), 113-116

AB The authors 1st report a method combining ion implantation and phys. masking to generate material **libraries** of various ion-implanted samples. This approach offers rapid synthesis of samples with potential new compds. formed in the matrix, which may have specific luminescent properties. The depth-resolved cathodoluminescence (CL) measurements, accompanied with Rutherford backscattering spectrometry (RBS) and proton elastic scattering (PES) revealed some specific optical properties in the samples correlated with implanted ion distributions. These measurements are capable of

nondestructively and rapidly characterizing the compn. and the inhomogeneity of the **combinatorial film libraries**, which may det. their phys. properties.

L3 ANSWER 28 OF 70 CA COPYRIGHT 2002 ACS  
AN 132:85702 CA  
TI Phosphor materials  
IN McFarland, Eric; Danielson, Earl; Devenney, Martin; Reaves, Casper; Giaquinta, Daniel M.; Poojary, Damodara M.; Wu, Xin Di; Golden, Josh H.  
PA Symyx Technologies, USA  
SO U.S., 20 pp.  
PI US 6013199 A 20000111 US 1998-19425 19980205 US 6203726  
B1 20010320 US 1999-414218 19991007  
PRAI US 1997-39882P P 19970304  
AB Phosphors are described which comprise (Y0.82Al0.07La0.06)VO4:Eu0.05 or orthorhombic Sr2CeO4. Methods for producing luminescence (e.g., photoluminescence, electroluminescence, and cathodoluminescence) by stimulating the Sr2CeO4 phosphors are also described. **Combinatorial synthesis and screening** methodologies were used in **identifying** the **phosphors**.

L3 ANSWER 29 OF 70 CA COPYRIGHT 2002 ACS  
AN 132:16783 CA  
TI **Optimization** of cerium doped garnets using **combinatorial** chemistry for application as luminescent conversion phosphors in white LEDs  
AU Wu, Jennifer L.; Devenney, Martin; Danielson, Earl; Poojary, Damodara; Weinberg, Henry  
CS Department of Chemical Engineering, University of California, Santa Barbara, CA, 93106, USA  
SO Materials Research Society Symposium Proceedings (1999), 560 (Luminescent Materials), 65-70  
AB An area of considerable research interest is the development of visible light, down-conversion phosphors for application in white light emitting diodes (LEDs). In such devices, a blue LED can act as the primary light source, exciting photoluminescence in a phosphor with subsequent broad band emission occurring at visible wavelengths of lower energy. A **combinatorial** approach to **synthesize** and **screen** potential inorg. **phosphors** for such an application was developed. Using soln. chem. techniques, solid state thin film **arrays** of  $(Y_{1-x}Gd_x)_{3-z}(Al_{1-y}Ga_y)_{5012}:Ce^{3+}$ , where x and y range from 0 to 1.0 and z is 0.03 were synthesized. Subsequent characterization demonstrates that the **combinatorial** approach can be used to rapidly **screen** potential **phosphors** for use as luminescence down-converters in white LEDs. Emission and excitation trends match those reported in the literature for traditionally prep'd. powder samples. The optimal Ce<sup>3+</sup> concn. in Y<sub>3</sub>Al<sub>5</sub>O<sub>12</sub> (YAG) was identified as ~1.5 mol%, and within the YAG-substituted host specific compns. were **identified** as promising blue to yellow **phosphor** candidates.

L3 ANSWER 30 OF 70 CA COPYRIGHT 2002 ACS  
AN 131:294659 CA  
TI **Combinatorial** materials synthesis and screening: an integrated materials chip approach to **discovery** and **optimization** of functional materials  
AU Xiang, X.-D.  
CS Lawrence Berkeley National Laboratory, Berkeley, CA, 94720, USA  
SO Annual Review of Materials Science (1999), 29, 149-171  
AB A review with 42 refs. **Combinatorial** materials synthesis methods and high throughput evaluation techniques were developed to accelerate the process of materials **discovery** and **optimization**. Analogous to integrated circuit

chips, integrated materials chips contg. thousands, possibly millions, of different compds./materials, often as high-quality epitaxial thin film can be fabricated and screened for interesting phys. or chem. properties. Microspot x-ray methods, various optical measurement techniques, and a novel evanescent microwave microscope were used to characterize the structural, optical, magnetic, and elec. properties of samples on materials chips. These techniques are routinely used to **discover** and **optimize** luminescent, ferroelec., dielec., and magnetic materials.

LB ANSWER 31 OF 70 CA COPYRIGHT 2002 ACS  
AN 131:292570 CA  
TI **Combinatorial search** for advanced luminescence materials  
AU Sun, Ted X.  
CS Corporate Research and Development, General Electric Company, Schenectady, NY, 12309, USA  
SO Biotechnology and Bioengineering (1999), Volume Date 1998-1999, 61(4), 193-201  
AB A review with 29 refs. Phosphors are key materials in fluorescent lighting, displays, x-ray scintillation, etc. The rapid development of modern photonic technologies, e.g., Hg-free lamps, flat panel displays, CT-detector **array**, etc., demands timely **discovery** of advanced **phosphors**. To this end, a **combinatorial** approach was developed and applied to accelerated exptl. **search** of advanced **phosphors** and scintillators. **Phosphor libraries** can be made in both thin film and powder form, using masking strategies and liq. dispensing systems, resp. High-d. **libraries** with 100-1000 discrete **phosphor** compns. on a 1"-square substrate can be made routinely. Both compns. and synthesis temps. can be screened in a high-throughput mode. Details on the existing methods of **combinatorial** synthesis and **screening** of **phosphors** will be reported with examples. These methods are generic tools for application of **combinatorial** chem. in the **discovery** of other solid state materials. A few highly efficient **phosphors** discovered with **combinatorial** methods were reproduced in bulk form and their luminescent properties measured.

LB ANSWER 32 OF 70 CA COPYRIGHT 2002 ACS  
AN 131:263121 CA  
TI **Combinatorial** approaches to materials **discovery**  
AU McFarland, Eric W.; Weinberg, W. Henry  
CS Symyx Technologies, Santa Clara, CA, 95051, USA  
SO Trends in Biotechnology (1999), 17(3), 107-115  
AB A review with 55 refs.; using a mixt. of scientific intuition, iteration and serendipity, **combinatorial** materials science is an approach to the **discovery** and study of new materials that combines high-speed chem. synthesis, high-throughput screening and high-capacity information processing to create, analyze and interpret large nos. of new and diverse material compns. Technol. has now been developed that makes this powerful integration possible. The classes of materials under investigation include catalysts, luminescent, optical, magnetic and dielec. materials, and structural polymers.

LB ANSWER 33 OF 70 CA COPYRIGHT 2002 ACS  
AN 131:131245 CA  
TI Design, synthesis, and evaluation of a dye **library**: glass-forming and solid-state **luminescent** merocyanines for functional **materials**  
AU Wurthner, Frank; Sens, Rudiger; Etzbach, Karl-Heinz; Seybold, Gunther  
CS BASF Aktiengesellschaft ZDT - Farbenlaboratorium, Ludwigshafen, D-67056, Germany  
SO Angewandte Chemie, International Edition (1999), 38(11), 1649-1652

AB Hydroxypyridone derivs. of thiadiazoles or methylene bases, using DMF as formylating reagent in a highly efficient **multicomponent** synthesis, were prepd. as merocyanines.

L3 ANSWER 34 OF 70 CA COPYRIGHT 2002 ACS

AN 131:67205 CA

TI A **combinatorial** approach to the **discovery** of advanced materials

AU Sun, Xiao-Dong

CS Univ. of California, Berkeley, CA, USA

SO (1998) 98 pp. Avail.: UMI, Order No. DA9902246 From: Diss. Abstr. Int., B 1999, 59(8), 4107

DT Dissertation

L3 ANSWER 36 OF 70 CA COPYRIGHT 2002 ACS

AN 130:358799 CA

TI Luminescence excitation mechanisms of rare earth doped phosphors in the VUV range

AU Belsky, A. N.; Krupa, J. C.

CS Physics Faculty, Moscow State University, Moscow, Russia

SO Displays (1999), 19(4), 185-196

AB Progress in the development of new luminescent materials is directly related to the authors' understanding of phys. processes of energy absorption and relaxation in solids. As far as the VUV energy is concerned, the most suitable materials are probably the large band gap inorg. lattices activated by rare earth ions. Optical excitation in these systems result either in a direct excitation of the luminescence center or an excitation of the host lattice which partly transfer the energy to the emitting levels of the activator. Every steps of the luminescence mechanism enter in competition with nonradiative losses or undesired luminescence which have to be minimized to get a high luminescence efficiency. Detn. of the dominant transfer and energy loss mechanisms can be performed by time resolved luminescence spectroscopy using UV-VUV synchrotron radiation (SR) excitation. The authors report here, the result of studies of a large no. of rare earth doped materials, performed in the frame of programs for **search** of new efficient VUV **phosphors** and scintillators. The expts. were performed using XUV-VUV SR from SuperAco and DCI storage rings at LURE.

L3 ANSWER 37 OF 70 CA COPYRIGHT 2002 ACS

AN 130:132080 CA

TI **Combinatorial** synthesis and high throughput evaluation of functional oxides. An integrated materials chip approach

AU Xiang, X.-D.

CS Lawrence Berkeley National Laboratory, Berkeley, CA, 94720, USA

SO Materials Science & Engineering, B: Solid-State Materials for Advanced Technology (1998), B56(2,3), 246-250

AB A review with 9 refs. Integrated materials chip approach, in which large collections of different thin film metal oxides are integrated and synthesized on a small chip and screened for a particular functionality, is applied to **discover** or **optimize** superconductors, **luminescent materials**, magnetic **materials**, ferroelecs. and dielecs. This technol. promises to significantly increase the efficiency of the materials **discovery** and **optimization** process and improve our understanding of materials structure-property relationship.

L3 ANSWER 38 OF 70 CA COPYRIGHT 2002 ACS

AN 130:74123 CA

TI X-ray powder structure of Sr<sub>2</sub>CeO<sub>4</sub>: a new **luminescent material discovered** by

AU combinatorial chemistry  
AU Danielson, Earl; Devenney, Martin; Giaquinta, Daniel M.; Golden, Josh H.; Haushalter, Robert C.; McFarland, Eric W.; Poojary, Damodara M.; Reaves, Casper M.; Weinberg, W. Henry; Wu, Xin Di  
CS Symyx Technologies, Santa Clara, CA, 95051, USA  
SO Journal of Molecular Structure (1998), 470(1-2), 229-235  
AB A new luminescent inorg. oxide Sr<sub>2</sub>CeO<sub>4</sub> was discovered using combinatorial chem. methodologies. A combinatorial library consisting of >25,000 chem. distinct compns. was prep'd. by an automated thin film phys. vapor deposition method. The lead compd. responsible for the luminescence in the Sr-Ce-O region of the library was prep'd. in bulk quantity for structural study. The three-dimensional structure of the compd. was solved ab initio from x-ray powder diffraction data and refined by the Rietveld method. The structure consists of 1-dimensional chains of edge-sharing CeO<sub>6</sub> octahedra that are linked together by Sr<sup>2+</sup> ions. A bulk sample prep'd. with the same elemental compn. as above but heated for a shorter time was analyzed for the presence and amt. of different phases formed in the initial stages of the reaction. This sample consists of SrCO<sub>3</sub>, CeO<sub>2</sub>, SrCeO<sub>3</sub>, and Sr<sub>2</sub>CeO<sub>4</sub>. Upon prolonged heating the former three phases convert to the final product, Sr<sub>2</sub>CeO<sub>4</sub>.

ANSWER 39 OF 70 CA COPYRIGHT 2002 ACS  
AN 129:310072 CA  
TI Synchrotron x-ray microbeam diagnostics of combinatorial synthesis  
AU Isaacs, E. D.; Marcus, M.; Aeppli, G.; Xiang, X.-D.; Sun, X.-D.; Schultz, P.; Kao, H.-K.; Cargill, G. S., III; Haushalter, R.  
CS Bell Laboratories, Murray Hill, NJ, 07974, USA  
SO Applied Physics Letters (1998), 73(13), 1820-1822  
AB X-ray microbeam techniques (spot size = 3×20 μm<sup>2</sup>) were applied to characterize the compn. and structure of rare earth activated Gd(La,Sr)AlO<sub>3</sub> phosphor thin films grown by combinatorial synthesis. Using x-ray fluorescence, x-ray diffraction and near-edge x-ray absorption spectroscopy, the authors have measured the chem. compn., crystallog. structure, and valence state of the rare earth activator atom Eu. These measurements represent the direct application of x-ray techniques to solid-state materials prep'd. by combinatorial synthesis and demonstrate the power of x-ray microbeam anal. to nondestructively characterize as-grown combinatorial libraries.

ANSWER 42 OF 70 CA COPYRIGHT 2002 ACS  
AN 128:296249 CA  
TI Optical systems and methods for rapid screening of libraries of different materials  
IN McFarland, Eric W.; Danielson, Earl; Archibald, William  
PA Symyx Technologies, USA  
SO PCT Int. Appl., 46 pp.  
PI WO 9815805 A1 19980416 WO 1997-US18521 19971008  
US 6030917 A 20000229 US 1997-898715 19970722  
PRAI US 1996-28105P P 19961009  
AB Methods and app. for screening diverse arrays of materials are given. In particular, techniques for rapidly characterizing compds. in arrays of materials to discover and/or optimize new materials with specific desired properties are given. The substrate can be screened for materials having useful properties, and/or the resulting materials can be ranked or compared for relative performance with respect to useful properties or other characterizations. In particular, systems and methods are given for screening a library of magnetic materials for their bulk magnetization, satn. magnetization, and coercivity by imaging their individual optical

Kerr rotation, screening a **library** of dielec. materials for their dielec. coeffs. by imaging their individual electro-optical rotation, and **screening** a **library** of **luminescent materials** by imaging their individual luminescent properties under a variety of excitation conditions. Optical or visible luminescence systems are also given with their application to screening **libraries** of different materials.

16 ANSWER 43 OF 70 CA COPYRIGHT 2002 ACS

AN 128:277677 CA

TI Identification of a blue photoluminescent composite material from a **combinatorial library**

AU Wang, Jingsong; Yoo, Young; Gao, Chen; Takeuchi, Ichiro; Sun, Xiaodong; Chang, Hauyee; Xiang, X. -D.; Schultz, Peter G.

CS Materials Sci. Div., Lawrence Berkeley National Lab., Berkeley, CA, 94720, USA

SO Science (Washington, D. C.) (1998), 279(5357), 1712-1714

AB A quaternary **combinatorial** masking strategy was used in conjunction with photolithog. to generate compositionally diverse thin-film **phosphor**

**libraries** contg. 1024 different compns. on substrates 2.5 cm square. A parallel imaging system and scanning spectrophotometer were used to identify and characterize compns. in the **library** with interesting luminescent behavior. Optimal compns. were identified with the use of gradient **libraries**, in which the stoichiometry of a material was varied continuously. This process led to the identification of an efficient blue photoluminescent composite material, Gd<sub>3</sub>Ga<sub>5</sub>O<sub>12</sub>/SiO<sub>2</sub>. Exptl. evidence suggests that luminescence in this material may arise from interfacial effects between SiO<sub>2</sub> and Gd<sub>3</sub>Ga<sub>5</sub>O<sub>12</sub>.

17 ANSWER 44 OF 70 CA COPYRIGHT 2002 ACS

AN 128:223198 CA

TI A rare-earth **phosphor** containing one-dimensional chains **identified** through **combinatorial** methods

AU Danielson, Earl; Devenney, Martin; Giaquinta, Daniel M.; Golden, Josh H.; Haushalter, Robert C.; McFarland, Eric W.; Poojary, Damodara M.; Reaves, Casper M.; Weinberg, W. Henry; Wu, Xin Di

CS Symyx Technologies, San Jose, CA, 95051, USA

SO Science (Washington, D. C.) (1998), 279(5352), 837-839

AB An unusual luminescent inorg. oxide, Sr<sub>2</sub>CeO<sub>4</sub>, was identified by parallel screening techniques from within a **combinatorial library** of >25,000 members prep'd. by automated thin-film synthesis. A bulk sample of single-phase Sr<sub>2</sub>CeO<sub>4</sub> was prep'd., and its (orthorhombic) structure, detd. from powder x-ray diffraction data, reveals 1-dimensional chains of edge-sharing CeO<sub>6</sub> octahedra, with two terminal oxygen atoms per cerium center, that are isolated from one another by Sr<sup>2+</sup> cations. The emission max. at 485 nm appears blue-white and has a quantum yield of 0.48 ± 0.02. The excited-state lifetime, ESR, magnetic susceptibility, and structural data all suggest that luminescence originates from a ligand-to-metal Ce<sup>4+</sup> charge transfer.

18 ANSWER 45 OF 70 CA COPYRIGHT 2002 ACS

AN 128:198089 CA

TI New phosphor (Gd<sub>2</sub>-xZnx)O<sub>3</sub>-δ:Eu<sup>3+</sup> with high luminescent efficiency and superior chromaticity

AU Sun, Xiao-Dong; Xiang, X.-D.

CS Materials Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA, 94720, USA

SO Applied Physics Letters (1998), 72(5), 525-527

AB A new phosphor, (Gd<sub>1.54</sub>Zn<sub>0.46</sub>)O<sub>3</sub>-δ:Eu<sub>0.063+</sub>, with a photoluminescent

quantum efficiency of ~86 and a superior color chromaticity ( $x = 0.656$ ,  $y = 0.344$ ) compared to the state of art red **phosphor** Y2O3:Eu3+ was **identified** using the **combinatorial** thin film synthesis method. This phosphor may replace Y2O3:Eu3+ in display applications where a more satd. red phosphor is preferred.

L3 ANSWER 47 OF 70 CA COPYRIGHT 2002 ACS  
AN 128:40981 CA  
TI A **combinatorial** approach to the **discovery** and **optimization** of **luminescent materials**  
AU Danielson, Earl; Golden, Josh H.; McFarland, Eric W.; Reaves, Casper M.; Weinberg, W. Henry; Wu, Xin Di  
CS Symyx Technol., Santa Carla, CA, 95051, USA  
SO Nature (London) (1997), 389(6654), 944-948  
AB **Combinatorial** synthesis and screening of very large nos. of org. compds. has been widely applied in the pharmaceutical industry for drug **discovery**. Recently, **combinatorial arrays** of inorg. materials with known or potential supercond. and giant magnetoresistance have been synthesized and screened. The **combinatorial** approach is particularly well suited to ternary and higher-order inorg. materials, for which efforts to predict basic properties have been unsuccessful. Here the authors describe an automated **combinatorial** method for synthesizing and characterizing thin-film **libraries** of up to 25,000 different materials, on a three-inch-diam. substrate, as candidates for new phosphors. The **discovery** and development of new compds. for UV-excited phosphors is of great importance for the development of flat-panel displays and lighting. As there are no reliable theories to predict the relation between compn. and phosphor color and efficiency, the less than 100 useful com. **phosphor** materials have been **discovered** through one-by-one serial synthesis and testing. The authors' approach, in contrast, offers rapid screening of many compns., and it has enabled one to **identify** a new red **phosphor**, Y0.845Al0.070La0.060Eu0.025VO4, which has a quantum efficiency comparable or superior to those of existing com. red phosphors.

L3 ANSWER 48 OF 70 CA COPYRIGHT 2002 ACS  
AN 128:17139 CA  
TI Solution-phase synthesis of **luminescent materials libraries**  
AU Sun, Xiao Dong; Wang, Kai An; Yoo, Young; Wallace-Freedman, William G.; Gao, Chen; Xiang, Xiao Dong; Schultz, Peter G.  
CS Molecular Design Institute, Lawrence Berkeley National Laboratory, Berkeley, CA, 94720, USA  
SO Advanced Materials (Weinheim, Germany) (1997), 9(13), 1046-1049  
AB A scanning **multi-ink-jet** delivery system, capable of accurately and rapidly delivering nanoliter vols. of reagents was used to fabricate a **library** of nitrates based on rare-earth-activated refractory metal oxides to **optimize** the luminescence properties via **combinatorial** approaches. The system consisting of 4-8 ink-jets operated at a conservative rate of 100 droplets/s generated a 100 component **library** ( $\approx 0.1$  mg/sample) in  $< 30$  min. The compns. were processed at  $900^\circ$  in air for 1 h and the samples examd. by AAA.

L3 ANSWER 49 OF 70 CA COPYRIGHT 2002 ACS  
AN 127:182627 CA  
TI **Identification** and **optimization** of advanced **phosphors** using **combinatorial libraries**  
AU Sun, Xiao-Dong; Gao, Chen; Wang, Jingsong; Xiang, X.-D.  
CS Molecular Design Institute, Lawrence Berkeley National Laboratory Berkeley, Berkeley, CA, 94720, USA

SO Applied Physics Letters (1997), 70(25), 3353-3355  
AB A combination of thin-film deposition and phys. masking steps were used to generate **libraries** of the rare earth activated refractory metal oxides, Gd(La,Sr)AlO<sub>x</sub>. Systematic variation of compn. and processing conditions afforded tricolor phosphors with the following nominal compns., (Gd<sub>0.46</sub>Sr<sub>0.31</sub>)Al<sub>1.23</sub>O<sub>x</sub>:Eu<sub>0.062+</sub> (green), La<sub>0.5</sub>Al<sub>1.5</sub>O<sub>x</sub>:Eu<sub>0.042+</sub> (blue), and Gd<sub>0.77</sub>Al<sub>1.23</sub>O<sub>x</sub>:Eu<sub>0.064+</sub> (red), which had quantum efficiencies of  $\geq 94$ ,  $\approx 60$ , and  $\geq 93\%$ , resp. at  $\lambda_{max,ex}$ . The high quenching temps. (250-350°), good chromaticities, and refractory nature of these phosphors are desirable features for display applications.

L3 ANSWER 52 OF 70 CA COPYRIGHT 2002 ACS

AN 126:96225 CA

TI Synthesis and low-voltage characteristics of CaTiO<sub>3</sub>:Pr luminescent powders

AU Cho, Sung Hee; Yoo, Jae Soo; Lee, Jong Duk

CS Dep. Chem. Eng., Chung-Ang Univ., Seoul, 156-756, S. Korea

SO Journal of the Electrochemical Society (1996), 143(10), L231-L234

AB CaTiO<sub>3</sub>:Pr phosphors which have relatively small bandgaps were synthesized and characterized for their application to field emitter displays. Good crystal powders, homogeneous, small ( $\sim 1 \mu\text{m}$ ), and spherical, were easily formed without flux. Phosphor prepn. parameters such as heat-treatment temp., time, and activator concn. were **optimized** for the maximal intensity of photoluminescence. **Phosphor** cathodoluminescent **characteristics** were examd. by a refractory metal electron gun in a high vacuum chamber. After electrophoretic deposition of phosphors on In Sn oxide (ITO) glass, then excitation by field emitter **arrays**, lumen intensity could be obtained  $\leq 10 \text{ cd/m}^2$  with chromaticity of X = 0.625 and Y = 0.297.

L3 ANSWER 65 OF 70 CA COPYRIGHT 2002 ACS

AN 100:164787 CA

TI **Investigation** of fluorescent lamp **phosphors** using the combined CL and EDS modes of the SEM

AU Richards, B. P.; Trigg, A. D.; King, W. G.

CS Res. Lab., GEC, Middlesex, HA9 7PP, UK

SO Scanning (1984), 6(1), 8-19

AB The phenomenon of cathodoluminescence (CL) potentially offers the ideal tool for studying the phosphor materials used in fluorescent lamps, since it can be used directly on processed or unprocessed powders, on coatings in tubes, or on sections cut from tubes. Using examples of both single component materials and **multicomponent** blends, it is demonstrated how a relatively unsophisticated dispersive CL system attached to a scanning electron microscope (SEM) can be used expediently in the extensive study of such phosphors. These studies can be significantly enhanced when other complementary modes of the SEM (e.g. the energy-dispersive x-ray anal. facility) are combined with the CL mode. The strength of the combined technique lies in the major role it can play in materials and processing aspects of the powders themselves, in the processing of the lamps (e.g. by **optimizing** such parameters as coating thickness, packing d. etc.), and in diagnostic studies of poor materials or lamps (e.g. by locating rogue particles/components and identifying their origin). The technique also provides a convenient method of studying the temp. stability of selected phosphors.

L3 ANSWER 68 OF 70 CA COPYRIGHT 2002 ACS

AN 87:175035 CA

TI Systematics of molecules according to their spectral-luminescent properties and Mendeleev's law

AU Shigorin, D. N.

CS Fiz.-Khim. Inst. im. Karpova, Moscow, USSR  
SO Zh. Fiz. Khim. (1977), 51(8), 1894-915

AB The proposed systematics is based on the general rule, according to which the spectral-luminescent properties of mols. are detd. by the relative position of lower electron-excited states of different orbital nature and **multiplicity** that are regularly affected by structural factors and intermol. interactions. The mols. are divided into 12 groups according to their orbitals, transitions, and states. The mols. of the same group of the systematics have similar electron structure and spectral-luminescence properties. The use of the systematics for **search** of new luminophors and active media of lasers is discussed.

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=> d his

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FILE 'CA' ENTERED AT 08:55:02 ON 01 NOV 2002

L1 142642 S COMBINATOR? OR LIBRARY OR ARRAY

L2 862 S L1 AND(VISCO? OR SLURRY)

L3 200 S L2 AND(PREPARE? OR FORMAT?)

L4 2 S L3 AND(DISPEN? OR PIPET?)

L5 8 S L3 AND(AUTOMAT? OR ROBOT? OR SEMIAUTO?)

L6 1808 S (AUTOMAT? OR ROBOT? OR SEMIAUTO?) (5A) (DISPENS? OR PIPET? OR TRANSFER?)

L7 30 S L6 (L) (VISCO? OR SLURRY)

L8 37 S L4-5,L7

=> d 18 bib,ab 1-37

L8 ANSWER 10 OF 37 CA COPYRIGHT 2002 ACS  
AN 135:41469 CA

TI A new human genetic resource: a DNA bank established as part of the Avon Longitudinal Study of Pregnancy and Childhood (ALSPAC)

AU Jones, Richard W.; Ring, Susan; Tyfield, Linda; Hamvas, Renata; Simmons, Hugh; Pembrey, Marcus; Golding, Jean

CS ALSPAC Study Team, Institute of Child Health, University College London, London, WC1N 1EH, UK

SO European Journal of Human Genetics (2000), 8(9), 653-660

AB We describe a unique human DNA resource forming part of the Avon Longitudinal Study of Pregnancy and Childhood (ALSPAC), a longitudinal cohort study involving 14,000 children and their families living in a geog. defined area of England. The DNA bank will underpin the search for assocns. between genetic polymorphisms and common health outcomes. The opportunities to collect blood samples suitable for DNA extn. are necessarily limited, and the samples themselves have often been treated in different ways and have varied storage histories. With the need to maximize yields, the choice of DNA extn. method is crit. to the success of the bank and we have investigated the suitability of various com. and inhouse methods of DNA extn. Various steps have been taken to minimize errors in sample address and identification, including the use of a **pipetting robot** for diln. and **transfer** of samples between 96-well arrays to provide aliquots suitable for PCR. The robot has been programmed to cope with concd. **viscous** DNA solns.

ANSWER 12 OF 37 CA COPYRIGHT 2002 ACS  
AN 133:40267 CA

TI Immunological method and device for the determination of antibodies, antigens and blood groups using agglutination reaction and sedimentation  
IN Spindler, Jorg  
PA Deutsches Rotes Kreuz Blutspendedienst Baden-Wurttemberg Gemeinnutzige Gesel, Germany  
SO PCT Int. Appl., 27 pp.  
PI WO 2000034790 A2 20000615 WO 1999-EP9721 19991209  
PRAI DE 1998-19856703 A 19981209  
AB The invention relates to a method for detecting antibodies or antigens in a test fluid as well as for detg. blood groups by reaction with a defined specific binding partner. The antigen or antibody or specific binding partner are either present in free form in the test fluid or bonded to a support. In case of a pos. antigen-antibody reaction an agglutination product of antigens or antibodies, the corresponding binding partners and the support materials is formed, which can be optically detected. A microreaction vessel having a cross-section which narrows from the top downwards contains a **viscous** substance, notably a gel. A test fluid is placed into the vessel. The specific binding partner is added to either the test fluid or the gel, or a liq. contg. said binding partner is added to the vessel after the test fluid has been placed in it. The sedimentation image is then evaluated optically. A flat agglutination product of antigens or antibodies, binding partners and support materials indicates a pos. antigen-antibody reaction, a deposit of antigens or antibodies and binding partners and/or support materials in the lower, narrow area of the vessel indicates a neg. reaction. The above method can be carried out in a fully automated manner, for example by using a **pipetting robot**.

ANSWER 14 OF 37 CA COPYRIGHT 2002 ACS  
132:139149 CA  
TI Fully automated membrane dispensing in nanoliter scale and its application in sensor manufacturing  
AU Joergensen, Corinna; Kuennecke, Wolfgang  
CS TRACE Biotech AG, Braunschweig, Germany  
SO Proceedings of SPIE-The International Society for Optical Engineering (1999), 3857(Chemical Microsensors and Applications II), 207-214  
AB The rising degree of miniaturization in sensor technol. and the efforts to make industrial use of it require an adequate soln. for coating of sensors with membranes needed for various applications. A fully **automated dispensing** device was developed which is capable of dispensing droplets in nanoliter range with high accuracy and reproducibility. The device combines a three axles positioning system with a pattern recognition system and a dispensing value and is suited for industrial mass prodn. of sensors. Up to 150 droplets per min are possible. Positioning accuracy is below three micrometer and std. deviation of the dispensing process is 2% or lower. The reproducibility of the process is independent from properties of the medium to be dispensed such as **viscosity** or solvent and shows no dependence on dispensing parameters such as needle diam. or dispensing time. The measurement of dissolved oxygen in a liq. soln. serves as application example to show the practical suitability of the dispensing device.

ANSWER 16 OF 37 CA COPYRIGHT 2002 ACS  
129:260747 CA  
TI Solvent for biopolymer synthesis, solvent microdroplets and apparatus employing inkjet pump for **automated** solid-phase synthesis of biopolymers  
IN Blanchard, Alan P.  
PA University of Washington, USA

SO PCT Int. Appl., 162 pp.  
PI WO 9841531 A2 19980924 WO 1998-US5483 19980320  
US 6028189 A 20000222 US 1997-821156 19970320  
US 6419883 B1 20020716 US 1998-8120 19980116  
US 6384210 B1 20020507 US 2000-381487 20000313

PRAI US 1997-821156 A2 19970320

AB The present invention provides a method of biopolymer, esp. oligonucleotide, synthesis. The method consists of coupling a first nucleotide to a second nucleotide in a high surface tension solvent. The invention also provides microdroplets of a soln. comprising a solvent having a b.p. of 150 °C or above, a surface tension of 30 dynes/cm or above, and a **viscosity** of 0.015 g/(cm) (sec), e.g., propylene carbonate. Such microdroplets are useful for the synthesis of chem. species, particularly biopolymers such as oligonucleotides and peptides, as well as **arrays** of chem. species. An **automated** system for oligonucleotide synthesis is described, which comprises delivery of microdroplets by inkjet technol. and computer control of the process. The high surface tension solvent used is selected for compatibility with the inkjet technol.

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